

CLAIMS

- [cl001] 1. A curing light comprising:
- a primary heat sink capable of dissipating heat created by a semiconductor light source,
 - a well in said heat sink, said well being sized to receive a semiconductor chip capable of producing light that is useful in curing light-curable materials,
 - a top opening of said well,
 - a bottom of said well,
 - a wall of said well, said wall of said well being capable of reflecting light,
 - a semiconductor chip capable of producing light that is useful in curing light-curable materials,
 - said semiconductor chip having a substrate,
 - said semiconductor chip having a plurality of epitaxial layers,
 - at least one of said epitaxial layers being an active layer.
- [cl002] 2. A curing light as recited in claim 1 wherein said substrate is selected from the group consisting of Si, GaAs, GaN, InP, sapphire, SiC, GaSb, and InAs.
- [cl003] 3. A curing light as recited in claim 1 wherein at least some of said epitaxial layers are selected from the group consisting of contact layers, cladding layers, active layers, and buffer layers.
- [cl004] 4. A curing light as recited in claim 1 wherein at least one of said epitaxial layers includes a material from the group consisting of GaN, AlGaIn, and InGaIn.
- [cl005] 5. A curing light as recited in claim 1 wherein said well has a reflective wall that includes a material selected from the group consisting of Al, Au, Ag, Zn, Cu, Pt, chrome, metal, plating and plastic, said well wall being capable of reflecting light of a wavelength produced by said chip.

[cl006] 6. A curing light as recited in claim 1 wherein said semiconductor chip is selected from the group consisting of light emitting diode chips, laser chips, light emitting diode chip array, diode laser chips, diode laser chip array, surface emitting laser chips, edge emitting laser chips, and VCSEL chips.

[cl007] 7. A curing light as recited in claim 1 wherein said chip is held in place in said well by use of an adhesive selected from the group consisting of heat conductive adhesive and light reflective adhesive.

[cl008] 8. A curing light as recited in claim 1 further comprising a secondary heat sink, said secondary heat sink being affixed to said heat sink, and said secondary heat sink being capable of assisting in dissipation of heat produced by said chip.

[cl009] 9. A curing light as recited in claim 1, further comprising a wand adapted to be grasped by a human hand for applying light produced by the curing light to a light curable material.

[cl010] 10. A curing light as recited in claim 9 further comprising a switch on said wand for initiating emission of light from said semiconductor chip.

[cl011] 11. A curing light as recited in claim 1 further comprising a cover that provides protective covering for said semiconductor chip and which permits light emitted by said semiconductor chip to substantially pass through it.

[cl012] 12. A curing light as recited in claim 11 wherein said cover is selected from the group consisting of windows and focus lenses.

[cl013] 13. A curing light as recited in claim 8 wherein said secondary heat sink is elongate in shape.

[cl014] 14. A curing light comprising:
a primary heat sink capable of dissipating heat created by a semiconductor light source,

a well in said heat sink, said well being sized to receive a semiconductor chip capable of producing light that is useful in curing light-curable materials,
a top opening of said well,
a bottom of said well,
a wall of said well, said wall of said well being capable of reflecting light,
a semiconductor chip capable of producing light that is useful in curing light-curable materials,
said semiconductor chip having a substrate,
said substrate being selected from the group consisting of Si, GaAs, GaN, InP, sapphire, SiC, GaSb, and InAs,
said semiconductor chip having a plurality of epitaxial layers,
a contact layer as one of said epitaxial layers, said contact layer serving to establish an electrical contact for said chip,
a cladding layer as one of said epitaxial layers,
an active layer as one of said epitaxial layers, said active layer serving to allow electrons jump from a conduction band to valance and emit energy which converts to light, and
a buffer layer as one of said epitaxial layers.

[cl015] 15. A curing light as recited in claim 14 wherein at least one of said epitaxial layers includes a material from the group consisting of GaN, AlGaIn, and InGaIn.

[cl016] 16. A curing light as recited in claim 14 wherein said well has a reflective wall that includes a material selected from the group consisting of Al, Au, Ag, Zn, Cu, Pt, chrome, metal, plating and plastic, said well wall being capable of reflecting light of a wavelength produced by said chip.

[cl017] 17. A curing light as recited in claim 14 wherein said chip is held in place in said well by use of an adhesive selected from the group consisting of heat conductive adhesive and light reflective adhesive.

[cl018] 18. A curing light as recited in claim 14 further comprising a secondary heat sink, said secondary heat sink being affixed to said heat sink, and said

secondary heat sink being capable of assisting in dissipation of heat produced by said chip.

[cl019] 19. A curing light comprising:

a housing for containing components of the curing light,
a handpiece of manipulation and applying light from the curing light to a light-curable material,
electronic circuitry for controlling the curing light,
a primary heat sink capable of dissipating heat created by a semiconductor light source,
a semiconductor chip capable of producing light that is useful in curing light-curable materials,
said semiconductor chip being affixed to said primary heat sink by use of an adhesive,
said semiconductor chip having a substrate,
said substrate being selected from the group consisting of Si, GaAs, GaN, InP, sapphire, SiC, GaSb, and InAs,
said semiconductor chip having a plurality of epitaxial layers,
a contact layer as one of said epitaxial layers, said contact layer serving to establish an electrical contact for said chip,
a cladding layer as one of said epitaxial layers,
an active layer as one of said epitaxial layers, said active layer serving to allow electrons jump from a conduction band to valance and emit energy which converts to light, and
a buffer layer as one of said epitaxial layers;
wherein at least one of said epitaxial layers includes a material from the group consisting of GaN, AlGaIn, and InGaIn.

[cl020] 20. A curing light as recited in claim 19 further comprising a secondary heat sink, said secondary heat sink being affixed to said heat sink, and said secondary heat sink being capable of assisting in dissipation of heat produced by said chip.